PREVENTING COLD WEATHER INJURIES

For Commanders, Leaders, and Healthcare Providers

The common-sense guide to planning, training, and preparing for cold weather operations in Korea

A Typical Cold Weather Casualty…

…is 20 years old.

…is from a southern state.

…is an E4 or below.

…has less than 18 months time in service.

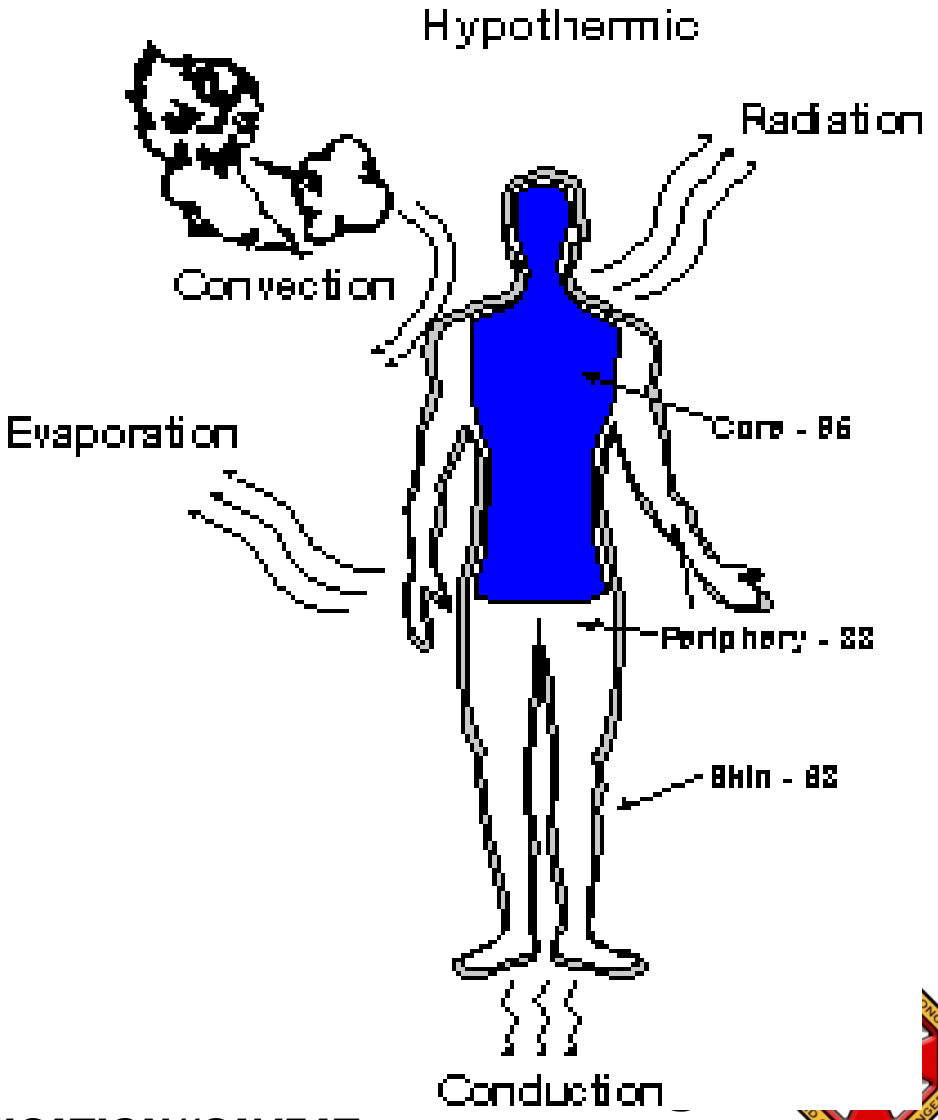
…has had a cold weather injury before.

…wears cold weather gear when not needed

…sleeps in a vehicle.

5 Methods of Heat Loss

- Evaporation
- Convection
- Conduction
- Radiation
- Respiration



Cold Weather Injuries

Non Freezing

- Hypothermia
- Chilblains
- Trench/Immersion foot

Freezing

- Frostbite
- Frost nip

Associated Injuries

- Snow Blindness
- Dehydration
- Carbon Monoxide Poisoning

Hypothermia

Number One Killer
- Loss of 4 or more degrees F body temp.
- Wet body contributes.

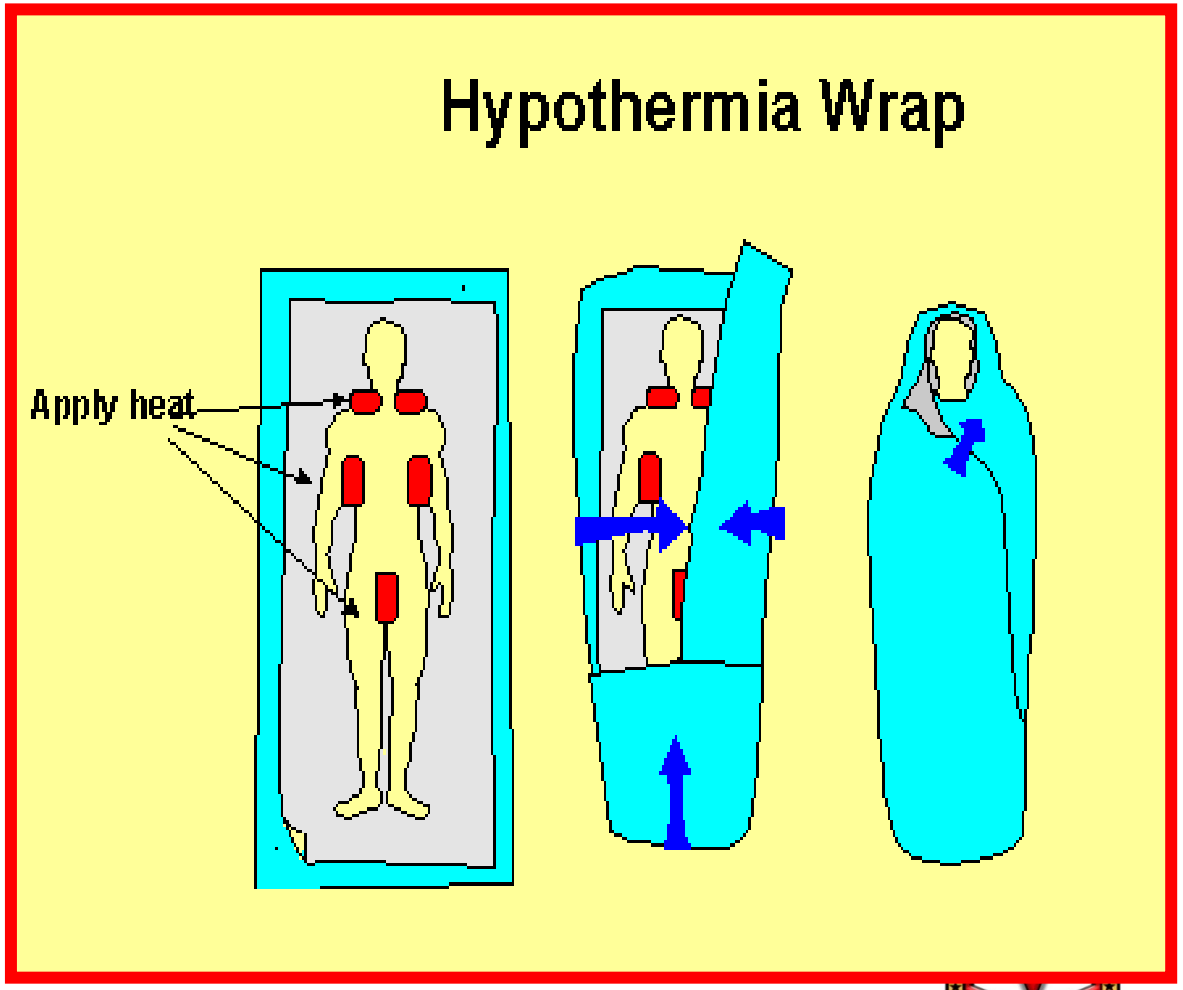
Cause
- Continued Exposure.
- Depleted energy supply.

Symptoms
- Shivering.
- Slow and Shallow Breathing.
- Slow Speech.
- Loss of Coordination.
- Memory Lapse.
- Hunger, nausea, fatigue.

Hypothermia

Treatment

- End exposure.
- Warm beverages.
- Keep victim in warm, dry clothes.
- Gradually re-warm.



Chilblain

Cause

- Repeated, chronic exposure of bare skin to temps 32º-60ºF.

Sign/Symptoms

- Appear as swollen, tender, papules.
- Complaint of burning or prickly sensation
- Redness.

Treatment

- Passive warming at room temp.
- No rubbing.
- Protect from trauma and secondary infection.

Trench/Immersion Foot

- Cause
  - Wet conditions, low temperature.
  - Prolonged contact with moisture at temps between 32º-50ºF
- Signs / Symptoms
  - Numbness and pain.
  - Swelling, tingling, itching.
  - Pale waxy skin.
  - Blistering.
- Treatment
  - Elevate, wrap in loose dressing.
  - Passive re-warming at room temp.
  - No massages or rubbing.
  - Air dry, no immersion in water.

World War I

Trench/Immersion Foot

- Immersion foot happens with exposure of 1-12 hours to moisture
- Trench foot sets in at +12 hours and can lead to rotting of flesh along with secondary infections

Frostbite

1st Degree (Frost Nip)
- Partial freezing
- Stinging

2nd Degree
- Clear Blisters
- Numbness and Burning pain

3rd Degree
- Blue-gray discoloration
- Bleeding blisters

4th Degree
- Blue
- Deeply aching

Frostbite

First Degree or Frost Nip

- Most superficial form of frostbite
- No permanent CWI

– ***Signs/symptoms***

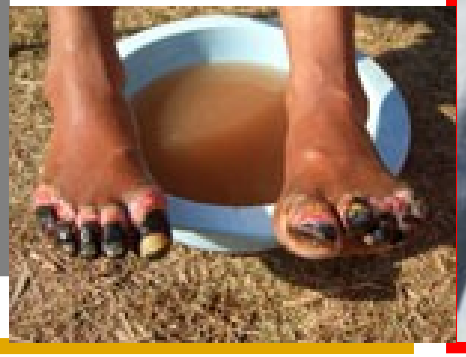
- Redness, mild swelling, pale, and edema

– ***Treatment***

- Warm immediately

Frostbite

- True freezing injury of tissues.
- Onset signaled by sudden blanching of the skin of nose, ears, cheeks, toes, followed by tingling.
- Frostbite has declared itself when these areas are painless.
- Intense coldness followed by numbness.



Frostbite

Second Degree or Superficial

- Entire epidermis.
- Skin redness in fair individuals.
- Grayish discoloration in darker skinned individuals.
- Clear blister formation at 24-36 hours followed by sheetlike desquamation.
- Persistent cold sensitivity in the area

Frostbite

Third and Fourth Degree or Deep

- **Loss of sensation with pale, yellow, waxy look if unthawed.**
- **Poor capillary refill.**
- **Tissue loss.**
- **Hemorrhagic bullae form in 3rd degree injuries at 12-35 hours unless re-warming is rapid.**
- **Red discoloring 1-5 days after injury.**
- **4th degree characterized by gangrene, necrosis, auto-amputation.**

Frostbite Treatment

- RAPID re-warming at temps slightly above body temperature is the single most effective treatment.
- Re-warm until the skin is pliable.
- NO dry heat -- stoves or campfires.
- No re-warming with exercise or rubbing.
- Do not re-warm in the field if there is a risk of refreezing.
- Protection from further injury, pad all affected areas.
- Loosely wrap with gauze and elevate.
- Remove wet and constrictive clothing.

Snow Blindness

Cause

- Light reflection off snow.

Signs and Symptoms

- Red, itchy eyes.
- Sensitivity to light.

Treatment

- Stay indoors.
- Rest eyes.
- Bandage eyes.

Prevention

- Wear sunglasses.

Carbon Monoxide Poisoning

- ***Terminology***
  - Carbon monoxide is a colorless, odorless gas produced by gasoline and diesel engines, and faulty heaters.
- ***Cause***
  - High concentrations gas build up due to poor ventilation.
  - Sleeping in parked vehicles with engine running.
- ***Signs and symptoms***
  - Headache.
  - Weakness and dizziness.
  - Nausea.
- ***Treatment***
  - Fresh air.
  - If not breathing, perform mouth to mouth resus
- ***Prevention***
  - Adequate ventilation in tents/ fire guards at all times!
  - Do not sleep in running vehicles!!!

Dehydration

- Cause - loss of body moisture
  - Dry air.
  - Not enough fluid intake.
- Signs/symptoms
  - Dry lips and mouth.
  - Dark yellow or orange urine.
  - Fatigue.
- Treatment/prevention
  - Drink frequently.
  - 1/2 –1 qt per hour during heavy work load.
  - Timed drinking.
  - Don’t use alcohol or tobacco.

Dressing for the C O L D

- Keep Clothing Clean

Dirt and grease block up the air spaces in your clothing and reduce the insulation value.

- Avoid Overheating

Sweat can freeze on outer layers. Stay dry, moisture will decrease the insulating ability of your clothing.

- Wear Clothing in Layers

Loose clothing allows air spaces to help trap warm air without restricting blood circulation. Good blood circulation helps to prevent frostbite.

- Keep Clothing Dry

You've got to keep your clothing dry, from the outside as well as from the inside.

6 Keys to Healthy Feet

- Get into a warm area if possible. Remove your boots and socks. Dry your feet, especially between your toes.
- Use foot powder.
- Massage your feet for about five minutes increasing circulation.
- Put on a dry pair of socks.
- Wipe out the inside of your boots to dry.
- Do this every 4 hours.

Protect Your Fingers

- Don’t wear gloves or mittens that are too tight.
- Allow blood to circulate freely.
- Failure to do so will cause hands to become cold, numb, or stiff.

Wind Chill Chart

WIND SPEED (IN MPH)	ACTUAL TEMPERATURE (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT CHILL TEMPERATURE (°F)											
CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	3	-9	-21	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	15	0	-15	-29	-44	-59	-74	-89	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-22	-37	-53	-69	-85	-101	-117	-132	-148
(WIND SPEEDS GREATER THAN 40 MPH HAVE LITTLE ADDITIONAL EFFECT)	LITTLE DANGER				INCREASING DANGER					GREAT DANGER		
	(In less than 5 hrs with dry skin. Greatest hazard from false sense of security)				(Exposed flesh may freeze within 1 minute)					(Exposed flesh may freeze within 30 seconds)		

To determine the windchill temperature, enter the chart at the row corresponding to the windspeed and read right until reaching the column corresponding to the actual air temperature.

Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
High **Digging foxhole, running, marching with rucksack, making or breaking bivouac**	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0 °F (-18°C); Increased hydration	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0 °F (-18°C)	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin
Low **Walking, marching without rucksack, drill and ceremony**	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10 °F (-12°C); Full head cover below 0 °F (-18°C). Keep skin dry -especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary **Sentry duty, eating, resting, sleeping, clerical work**	See above; Full head cover and no facial camouflage below 10 °F (-12°C); Cold-weather boots (VB) below 0 °F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

Generation (GEN) III
Extended Cold Weather Clothing System (ECWCS)

MOTIVATOR

The Army's goal is to create (Polartec®) products that would provide the War-fighter with gear that delivers performance, comfort, and protection from the threats of the battlefield, and towards the use of technical next-to-skin fabrics that increase comfort, safety, and performance for soldiers in the field. Polartec® Power Dry fabric®) was found best to meet the operational needs of the Soldiers.

"During Operation Mountain Lion I found myself praying for bad weather, the first time in my military career I was actually begging for a cold front to come through. I knew my Soldiers could handle it and the enemy couldn't. ECWCS allowed my men to out last the enemy on their own terrain. When the enemy was forced out of the mountains due to the bitter cold to take shelter, that's when we got them."

LTC Christopher Cavoli
Commander
1-32 IN BN, 10th MTN

System Overview

A multi-layered, versatile, insulating system that allows the Soldier to adapt to varying mission requirements and environmental conditions.
The twelve different components of the GEN III ECWCS consist of:

- **- 2 x Lightweight Cold Weather**
- **Undershirts/ Drawers**
- **- 1 x Mid-weight Cold Weather Shirt/**
- **Drawers**
- **- 1 x Fleece Cold Weather Jacket**
- **- 1 x Wind Cold Weather Jacket**
- **- 1 x Soft Shell Cold Weather Jacket/**
- **Trousers**
- **- 1 x Extreme Cold/Wet Weather Jacket/**
- **Trousers**
- **- 1 x Extreme Cold Weather**
- **Parka/Trousers**

Light Weight Cold Weather Under Layer "Silk Weight"

- Long sleeve top and full-length bottom garments constructed out of "silk weight" moisture wicking polyester. The undershirt has a crewneck with long sleeves. Flat seam construction reduces chafing.
- Aids in the movement of moisture fr the skin to the outer layers both while the wearer is moving or static. The drawers have an elastic waistband anc standard front fly opening.

Mid Weight Cold Weather Shirt and Drawers "Grid Fleece"

- **Long sleeve top and full-length bottom garments constructed out of polyester "grid" fleece.**
- **Provides light insulation for use in mild climates as well as acting as a layer for colder climates.**
- **Provides an increase of surface area for the transportation of moisture away from the wearer during movement.**

Fleece, Cold Weather, Jacket:

- Acts as the primary insulation layer for

use in moderate to cold climate.

- "Thermal Pro," animal fur mimicking

insulation provides an increase in the warmth to weight ratio along w

reduction in volume when packe

"Approved to wear as an outer garment!"

Wind, Cold Weather, Jacket:

- Made of a lightweight, windproof, and water repellant material.
- Acts as a low volume shell layer,

optimizing the performance of mois wicking along with insulation layers when combined with Body Armor and/or Army Combat Uniform.

Soft Shell:

- Made of a highly water resistant, wind proof material that increases moisture vapor permeability over current hard shell garments.
- Reduction in weight, bulk, and noise signature during movement.
- Increase of breath-ability improves performance of insulation layers by decreasing saturation due to moisture vapor accumulation.

Extreme Cold Wet Weather Jacket and Trousers:

- **“True” waterproof (highly resistant) layer for use in prolonged and/or hard rain and wet conditions.**

Extreme Cold Weather Parka/Trousers:

- **Highly water-resistant and windproof in order to provide wind and moderate moisture protection.**
- **Provides superior warmth with high compact ability, low weight, and low volume.**
- **Sized to fit over the Body Armor during movement or static activities requiring a maximum insulation.**
- **Trouser design will incorporate full side zips to allow for rapid donning and doffing over soft shell trousers.**
- **Insulation equivalent to 6.0 oz Primaloft quilted for warmth and durability.**

FORCE HEALTH PROTECTION

Contact Information:

Force Health Protection Office

Bldg 5447, South Post near Commissary

DSN: 736-3036/3025

Thank You!